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**Katkov et al.**

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(54) **METHOD AND SCALABLE DEVICES FOR  
HYPER-FAST COOLING AND WARMING**

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(57) **ABSTRACT**

The present invention, in some embodiments thereof, relates to a method and scalable devices for hyperfast cooling and re-warming of samples. More specifically, it relates to cryogenic preservation of biological samples via vitrification. It includes: a liquid sample placed at ambient temperature in a flat thermo conductive container that in some embodiments additionally contains a detachable disposable or sterilizable thermo conductive spiral; transferring the sample to a cooling chamber using a linear percussion stepping motor drive; hyperfast cooling of the sample using streams of pressurized liquid coolant; transferring the sample to a detachable shipping/storage chamber filled with liquid coolant, from which the sample can be transferred to another vessel that contains liquid cryogenic coolant and moved back to the shipping/storage chamber. This chamber can be then attached to a re-warming chamber, in which the sample is heated to a biologically tolerant temperature above 0 degrees Celsius in a hyperfast manner.

**7 Claims, 14 Drawing Sheets**

